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| CAMPBELL STEPHENSON ASCOLESE, LLP | | | DUONG, FRANK | |
| 4807 SPICEWOOD SPRINGS RD. | | | ART UNIT | |
| BLDG. 4, SUITE 201 | | | PAPER NUMBER | |
| AUSTIN, TX 78759 | | | 2666 | |

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Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/087,342 | Applicant(s) BECHTOLSHEIM ET AL. | |
| | Examiner Frank Duong | Art Unit 2666 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 32-92 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 73-89 is/are allowed.
- 6) ☒ Claim(s) 32-72 and 90-92 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is a response to communications dated 03/04/05. Claims 32-92 are pending in the application.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 32-42, 45-70 and 72 are rejected under 35 U.S.C. 102(b) as being anticipated by McAuley et al (Fast Routing Table Lookup Using CAMs, Bellcore, pages 1-10, 1993) (hereinafter "McAuley").

Regarding **claim 32**, in accordance with McAuley reference entirety, McAuley discloses a method of processing a packet (Figure 3) comprising:

configuring a plurality of access control specifiers (*Table 2; address/mask pairs and page 2, right column, last paragraph*) in an access control element (Routing Table or CAM) according to a priority of a type of each access control specifier (*Tables 5-6; Implicit priority associated with Address*), wherein the type of an access control specifier corresponds to information (search pattern) in an access control entry (search word)

(page 6, right column, McAuley discloses logical CAM is used to store data and sets its mask value and each CAM has its own search pattern);

matching one or more characteristics (*Figure 3 and 201; 201-829 and 201-829-4484*) of said packet with one or more access control specifiers (*Figure 3; Mask-3, Mask-6 and Mask-10*);

selecting a match corresponding to an access control specifier with a highest associated priority (*Figure 3; Prioritizer and page 6, right column to page 7, left column, McAuley discloses the match Prioritizer automatically selects the best match*); and

processing said packet based on said selecting (*Table 1; Address 201-829-xxxx corresponding to Next Hop Port B and page 7; left column, McAuley discloses prioritizer only enables one buffer to drive its signal onto the output bus. In other words, a match in this case would cause the received packet to be routed to port B*).

Regarding **claim 33**, in addition to features recited in claim 32 (see rationales discussed above), McAuley further discloses wherein said access control element is a content addressable memory (*Figure 3; CAM-1-CAM-3*).

Regarding **claim 34**, in addition to features recited in claim 32 (see rationales discussed above), McAuley further discloses wherein said matching and said processing is done in parallel (*Figure 3 and CAM-1-CAM-3 and page 7, left column, McAuley discloses packetAddress is used to search all the logical CAMs simultaneously*).

Regarding **claim 35**, in addition to features recited in claim 32 (see rationales discussed above), McAuley further discloses wherein said characteristics of said packet

comprises one or more of a source address, a destination address, a source port, a destination port, a protocol type, an input interface and an output interface (*page 1, left column; Introduction, first paragraph*).

Regarding **claim 36**, in addition to features recited in claim 32 (see rationales discussed above), McAuley further discloses wherein said characteristics of said packet comprises data carried by said packet in a packet header (*Figure 3; 201-829-4484 or Table 1*).

Regarding **claim 37**, in addition to features recited in claim 32 (see rationales discussed above), McAuley further discloses receiving said packet (*Figure 3; 201-829-4484 or page 1, right column, McAuley discloses routing table lookup function is executed every a packet arrives at a switch*).

Regarding **claim 38**, in addition to features recited in claim 32 (see rationales discussed above), McAuley further discloses identifying one or more of said access control specifiers based on said matching (*Figure 3; Prioritizer (distinguish best match in multiple matches; page 7, left column)*).

Regarding **claim 39**, in addition to features recited in claim 38 (see rationales discussed above), McAuley further discloses prioritizing said one or more of said access control specifiers identified based on said matching to generate a set of prioritized access control specifiers (*Figure 3; Prioritizer (distinguish best match in multiple matches; page 7, left column)*).

Regarding **claim 40**, in addition to features recited in claim 39 (see rationales discussed above), McAuley further discloses wherein said prioritizing is done in parallel by a priority encoder (*Figure 3; Prioritizer and page 7, left column*).

Regarding **claim 41**, in addition to features recited in claim 39 (see rationales discussed above), McAuley further discloses wherein said prioritizing (*Figure 3; Prioritizer*) is done based on an address of said access control specifiers (*address/mask pairs*) in said access control element (*Figure 3; CAM-1, CAM-2 or CAM-3*).

Regarding **claim 42**, in addition to features recited in claim 39 (see rationales discussed above), McAuley further discloses wherein said processing is done based on said set of prioritized access control specifiers (*Figure 3 and page 7, left column pertaining the result of port B by Prioritizer*).

Regarding **claim 45**, in addition to features recited in claim 32 (see rationales discussed above), McAuley further discloses if said packet requires forwarding, forwarding said packet (*Figure 3; PORT B*).

Regarding **claim 46**, in accordance with McAuley reference entirety, McAuley discloses a system (*Figure 3*) for processing a packet (*lookup*) comprising:

one or more access control specifiers, wherein said one or more access control specifiers are of one or more types of access control specifiers (*Table 2; address/mask pairs and page 2, right column, last paragraph*); and

an access control element (*Routing Table or CAM*), wherein said access control element is configured to store said one or more access control specifiers according to a priority of the type of each access control specifier (*Implicit priority associated with*

address is depicted in Tables 5&5 on page 7 and described through the McAuley reference); and

match one or more characteristics of said packet with one or more access control specifiers (*page 7, left column, second paragraph*); and

a priority encoder coupled to said access control element (*Figure 3 depicted Prioritizer coupled to CAM*), wherein said priority encoder is configured to select a highest priority match based on the priority of the types of access control specifiers (*Prioritizer distinguishes the best match is disclosed on page 7, left column, second paragraph and thereafter*).

Regarding **claim 47**, in addition to features recited in claim 46 (see rationales discussed above), McAuley further discloses wherein said priority encoder is further configured to prioritize said one or more access control specifiers according to an address of said one or more access control specifiers in said access control element (*Figure 3; Prioritizer and description on page 7, left column, second paragraph and thereafter*).

Regarding **claim 48**, in addition to features recited in claim 46 (see rationales discussed above), McAuley further discloses a compare unit (mask-3; mask-6 or mask-10) coupled to said access control element (CAM), wherein said compare unit is configured to compare (*Figure 3; AND gates*) said one or more characteristics of said packet (*201; 201-829; or 201-829-4484*) or (packet header) with one or more values (*Figure 3; MASK CIRCUIT and Table 2; Masks (hex.)*).

Regarding **claim 49**, in addition to features recited in claim 48 (see rationales discussed above), McAuley further discloses wherein said one or more values are predetermined (Table 3; Masks (hex.)).

Regarding **claim 50**, in addition to features recited in claim 48 (see rationales discussed above), McAuley further discloses wherein said one or more values are dynamically determined (Table 3; Masks (hex.)).

Regarding **claim 51**, in addition to features recited in claim 48 (see rationales discussed above), McAuley further discloses wherein said compare unit is further configured to perform arithmetic operation on data carried by said packet in a packet header (Figure 3; MASK CIRCUIT)

Regarding **claim 52**, in addition to features recited in claim 48 (see rationales discussed above), McAuley further discloses wherein said compare unit is further configured to perform logical operation on said data carried by said packet in said packet header (Figure 3; MASK CIRCUIT)

Regarding **claim 53**, in addition to features recited in claim 46 (see rationales discussed above), McAuley further discloses wherein said access control element further comprising: an access control memory (Figure 3; CAM-1, CAM-2 or CAM-3).

Regarding **claim 54**, in addition to features recited in claim 53 (see rationales discussed above), McAuley further discloses wherein said access control memory is a content-addressable memory (Figure 3; CAM-1, CAM-2 or CAM-3).

Regarding **claim 55**, in addition to features recited in claim 53 (see rationales discussed above), McAuley further discloses wherein said access control memory

(Routing Table or CAM) stores at least one of said access control specifier
(*address/mask pairs* or Table 2).

Regarding **claim 56**, in addition to features recited in claim 53 (see rationales discussed above), McAuley further discloses wherein said access control specifier (address/mask pairs or Table 2) further comprising:

a label match mask configured to determine whether a first corresponding bit of said one or more characteristics of said packet is tested (Figure 3; mask-3, mask-6 or mask-10); and

a label match pattern, wherein said label match pattern is compared with a second corresponding bit of said one or more characteristics of said packet (Figure 3; 3-digit matches Table, 6-digit matches Table or 10-digit matches Table).

Regarding **claim 57**, in addition to features recited in claim 46 (see rationales discussed above), McAuley further discloses a processor, coupled to said access control element, said processor is configured to process said packet when said packet is not processed by said access control element (*not shown; inherent to have processing mechanism in a switch*).

Regarding **claim 58**, in addition to features recited in claim 46 (see rationales discussed above), McAuley further discloses at least one input port coupled to said access control element, wherein said input port is configured to receive said packet (*Figure 3; input port depicted as input of 201-829-4484*); and
at least one output port (*Figure 3; output port depicted as Port B*) coupled to said access control element, wherein said packet is forwarded via said output port (*not*

shown; inherent as part of Figure 3 in order to receive and route packet as merely discloses in the Introduction "central function of [a switch] is to route a call or packet to appropriate destination").

Regarding **claim 59**, in accordance with McAuley reference entirety, McAuley discloses a system (*Figure 3 and description on page 6, right column, last paragraph to page 7, left column, first four paragraphs*) for processing a packet comprising:

means for configuring a plurality of access control specifiers (Table 2; address/mask pairs) in an access control element (*routing table or CAM*) according to a priority of a type (*Tables 5-6; Implicit priority*) of each access control specifier, wherein the type of an access control specifier corresponds to information in an access control entry (*Address*);

means for matching (*Figure 3; CAM-3, CAM-6 or CAM-10*) one or more characteristics of said packet (*Figure 3; 201, 201-829 and 201-829-4484*) with one or more of the access control specifiers (*Table 2; address/mask pairs*); and

means for selecting (*Figure 3; prioritizer*) a match corresponding to an access control specifier with a highest associated priority (*best match*); and

means for processing said packet (*not shown; inherently there is a processor or circuitry to process/append/encapsulate a packet with newly founded address after lookup process. See page 1, left column, last paragraph*) based on said matching (*drive signal indicating port B*).

Regarding **claim 60**, in addition to features recited in claim 59 (see rationales discussed above), McAuley further discloses wherein said access control element is a content addressable memory (Figure 3; CAM-1 or CAM-2 or CAM-3).

Regarding **claim 61**, in addition to features recited in claim 59 (see rationales discussed above), McAuley further discloses wherein said matching and said processing is done in parallel (Figure 3; CAM-1 or CAM-2 or CAM-3).

Regarding **claim 62**, in addition to features recited in claim 59 (see rationales discussed above), McAuley further discloses wherein said characteristics of said packet comprises one or more of a source address, a destination address, a source port, a destination port, a protocol type, an input interface and an output interface (*page 7, left column; port B*).

Regarding **claim 63**, in addition to features recited in claim 59 (see rationales discussed above), McAuley further discloses wherein said characteristics of said packet comprises data carried by said packet in a packet header (*page 7, left column*).

Regarding **claim 64**, in addition to features recited in claim 59 (see rationales discussed above), McAuley further discloses means for receiving said packet (*not shown; inherent as part of Figure 3 in order to receive and route packet*).

Regarding **claim 65**, in addition to features recited in claim 59 (see rationales discussed above), McAuley further discloses means for identifying one or more of said access control specifiers based on said matching (*Figure 3; prioritizer*).

Regarding **claim 66**, in addition to features recited in claim 64 (see rationales discussed above), McAuley further discloses means for prioritizing said one or more of

said access control specifiers identified based on said matching to generate a set of prioritized access control specifiers (*Figure 3; prioritizer*).

Regarding **claim 67**, in addition to features recited in claim 66 (see rationales discussed above), McAuley further discloses wherein said prioritizing is done in parallel by a priority encoder (*Figure 3; prioritizer*).

Regarding **claim 68**, in addition to features recited in claim 66 (see rationales discussed above), McAuley further discloses wherein said prioritizing is done based on an address of said access control specifiers in said access control element (*Figure 3; prioritizer*).

Regarding **claim 69**, in addition to features recited in claim 66 (see rationales discussed above), McAuley further discloses wherein said processing is done based on said set of prioritized access control specifiers (*Figure 3; prioritizer*).

Regarding **claim 70**, in addition to features recited in claim 59 (see rationales discussed above), McAuley further discloses wherein said processing further comprising: means for forwarding said packet to said higher-level processor if said packet requires processing by a higher-level processor (*not shown; inherent to have processing mechanism in a switch*).

Regarding **claim 72**, in addition to features recited in claim 59 (see rationales discussed above), McAuley further discloses means for forwarding said packet if said packet requires forwarding (*Figure 3; port B*).

Regarding **claim 91**, in addition to features recited in base claim 32 (see rationales discussed above), McAuley further discloses wherein said one or more

access control specifiers include a label match mask (*Figure 3; Mask-3, Mask-6 or Mask-10*) and a label match patter (*Figure 3; 201, 201-829 or 201-820-4484*).

Regarding **claim 92**, in addition to features recited in base claim 46 (see rationales discussed above), McAuley further discloses wherein said one or more access control specifiers include a label match mask (*Figure 3; Mask-3, Mask-6 or Mask-10*) and a label match patter (*Figure 3; 201, 201-829 or 201-820-4484*).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 43-44, 71 and 90-91 are rejected under 35 U.S.C. 103(a) as being unpatentable over McAuley in view of Wilford et al (USP 5,509,006) (hereinafter "Wilford").

Regarding **claims 43-44**, in addition to features recited in base claim 32 (see rationales discussed above), McAuley fails to further disclose an access control list telling a switch to perform certain actions (i.e., permit access, deny access or limit access, etc...) on a received packet. However, such limitation lacks thereof from McAuley reference is well known and disclosed by Wilford.

In accordance with Wilford reference entirety, Wilford discloses a packet switch comprising, among other things, an access control list (*FIG. 7C and col. 16, lines 7-49*) for determining forwarding permission for the packet to provide the switch with a way to control network access base on source and destination of the packet (*col. 16, lines 8-10. At col. 16, lines 46-49, Wilford also discloses the access control list may be converted into the tree memory 308 similarly to routing tables*). Wilford's permissions do not explicitly specify further processing the packet by another processor or dropping the packet. However, it is contemplated by a skill artisan such action can easily implement in Wilford's access control list using a software or some extra coding instruction.

It would have been obvious to those skilled in the art at the time of the invention was made to implement Wilford's access control list into McAuley's method by converting the access control list into routing tables to arrive the claimed invention with

a motivation to provide the switch with a way to control network access base on source and destination of the packet (*col. 16, lines 8-10*).

Regarding **claim 71**, in addition to features recited in base claim 59 (see rationales discussed above), McAuley fails to further disclose an access control list telling a switch to perform certain actions (i.e., permit access, deny access or limit access, etc...) on a received packet. However, such limitation lacks thereof from McAuley reference is well known and disclosed by Wilford.

In accordance with Wilford reference entirety, Wilford discloses a packet switch comprising, among other things, an access control list (*FIG. 7C and col. 16, lines 7-49*) for determining forwarding permission for the packet to provide the switch with a way to control network access base on source and destination of the packet (*col. 16, lines 8-10*). At *col. 16, lines 46-49*, Wilford also discloses the access control list may be converted into the tree memory 308 similarly to routing tables). Wilford's permissions do not explicitly specify dropping the packet. However, it is contemplated by a skill artisan such action can easily implement in Wilford's access control list using a software or some extra coding instruction.

It would have been obvious to those skilled in the art at the time of the invention was made to implement Wilford's access control list into McAuley's method by converting the access control list into routing tables to arrive the claimed invention with a motivation to provide the switch with a way to control network access base on source and destination of the packet (*col. 16, lines 8-10*).

Regarding **claim 90**, in accordance with McAuley reference entirety, McAuley discloses a method of processing a packet (*packet lookup; page 1, left column, Introduction*) comprising: selecting an output interface to which to forward the packet (*page 1; Introduction, McAuley discloses a function of a switch is to search a routing table for the information needed to route a packet to an appropriated output port or page 7, left column, McAuley discloses prioritizer enables one buffer to drive its signal onto the output bus or indication of port B is selected*); determining associated information for routing the packet (*page 1; Introduction or page 7, left column pertaining simultaneously search all logical CAMs*), wherein the determine comprises matching one or more characteristics (*Figure 3 and 201; 201-829 and 201-829-4484*) of said packet with one or more access control specifiers (*Figure 3; Mask-3, Mask-6 and Mask-10*) in at least one access control element (*Figure 3; CAM*); processing said packet based on said associated information (*page 2, right column, last paragraph; associated information gets return as a result of lookup*), wherein selecting step is performed in parallel with the determining step (*Figure 3 and CAM-1-CAM-3 and page 7, left column, McAuley discloses packetAddress is used to search all the logical CAMs simultaneously*). McAuley fails to implicitly disclose determining forwarding permission for the packet. However, such limitation lacks thereof from McAuley reference is well known and disclosed by Wilford.

In accordance with Wilford reference entirety, Wilford discloses a packet switch comprising, among other things, an access control list (FIG. 7C and col. 16, lines 7-49) for determining forwarding permission for the packet to provide the switch with a way to

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control network access base on source and destination of the packet (*col. 16, lines 8-10. At col. 16, lines 46-49, Wilford also discloses the access control list may be converted into the tree memory 308 similarly to routing tables*).

It would have been obvious to those skilled in the art at the time of the invention was made to implement Wilford's access control list into McAuley's method by converting the access control list into routing tables to arrive the claimed invention with a motivation to provide the switch with a way to control network access base on source and destination of the packet (*col. 16, lines 8-10*).

Allowable Subject Matter

4. Claims 73-89 are allowed.

5. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record, considered individually or in combination, fails to fairly show or suggest the claimed system comprising, among other limitations, the novel and unobvious limitations of "*means for matching matchable information, said matchable information being responsive to said packet label, with said set of access control patterns in parallel; means for generating a set of matches in response thereto, each said match having priority information associated therewith*", structurally and functionally interconnected with other limitations in a manner as recited in claims 73-89, .

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Doeringer et al, Routing on Longest-Matching Prefixes, IEEE, pages 86-97, 1996.

Shaffer, Designing Very Large Content-Addressable Memories, University of Pennsylvania, pages 1-38, 1992.

Molitor, Architecture for Advanced Packet Filtering, USENIX UNIX Security Symposium, pages 1-13, 1995.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank Duong whose telephone number is 571-272-3164. The examiner can normally be reached on 7:00AM-3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema S. Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read "Frank Duong". The signature is written in a cursive style with a vertical line on the left side of the first name.

Frank Duong
Primary Examiner
Art Unit 2666

April 20, 2005